EUROPA Quick Start

This tutorial provides just enough information for you to create and run simple planning problems using EUROPA. Once you're familiar with the basics, see the Documentation page for more details.

EUROPA can be used to solve Constraint Programming, Scheduling and Planning problem. For the purposes of this tutorial we will use a simple planning problem.

These are the main steps that a EUROPA user will normally follow to solve a problem :

- Create a model of the problem using NDDL, EUROPA's modeling language
- Create a particular instance of the problem using NDDL
- Instantiate a solver and ask it to look for a solution
- Inspect the plan, possibly modify the problem and re-plan
- When the model is working as expected, probably embed it into a larger application

Now, for our example, let's assume that we will create a plan to turn a light bulb on and off every 10 minutes. For this this simple domain here is what we would do.

TODO: Have PSUI run LightMgr by default, indicate at each step how to see the results. TODO: User must have build EUROPA already and have PLASMA and PlanWorks checked out

Create a NDDL model for the domain

The New Domain Description Language (NDDL) is a simple but powerful language used to describe both problem domains and problem instances in EUROPA

```
// Light.nddl

// TODO!!: rewrite this example in terms of states and actions

class LightMgr {
 predicate turnOn  {}
 predicate turnOff {}
}

/**
 * @brief Simple rules to force a repeated cycle
 */

LightMgr::turnOn
{
 lt(10,duration);
 meets (object.turnOff);
}
```

```
LightMgr::turnOff
{
 eq(duration,10);
 meets (object.turnOn);
}
```

TODO: describe this model line by line

Create a problem instance

```
// Light-initial-state.nddl

LightMgr mgr = new LightMgr();
fact(mgr.turnOn initialCondition);
eq(initialCondition.start,0);
goal(mgr.turnOff g);
lt(20,g.start);
```

Instantiate and run a Solver

TODO: describe how to do this in PSUI

Examine Results

TODO: describe how to do this in PSUI

= Embed your model into an application ==

TODO: describe how to dump results out

Examples

Now that we have cover the entire cycle with a simple example, here are some more advanced examples that can serve as starting points for your own model, or just to learn more about what EUROPA can do ;

- Constraint Programming : NQueens
- Scheduling : Resource Constrained Project Scheduling Problem (RCPSP)
- Planning : Rover

Next Steps

TODO: provide links

- How to create your own project in PSUI
- How to embed your model into a C++ or Java application
- All the details about modeling in NDDL, configuring the built-in solver and using EUROPA's debugging tools.

- Extending EUROPA adding your own constraints, solvers, etc